LIQUEFIED natural gas (LNG) buyers that fail to lock in supplies under long-term contracts risk ending up with nothing, says Linda Cook, Shell’s executive director for gas and power.

Buyers in Asia and Europe are starting to “mop up” – under long-term contract – volumes that had previously been considered flexible, says Cook. For example, Shell has recently struck deals with China and Dubai for off-take from the under-construction Qatargas 4 train – volumes that had originally been earmarked for North America and Europe.

“Countries or customers who are unwilling to secure supplies under long-term contract are running the risk that the natural gas won’t be there when they need it. Those that think all they need to do is build an LNG-import terminal and the LNG will come are making a risky assumption.”

The US is among the countries in danger of being caught short, she concedes: a large amount of the country’s LNG-import capacity remains idle because volumes are being heading for markets that are prepared to pay higher prices or to buyers that have secured off-take under long-term deals.

Cook expects the LNG business to continue to grow robustly – at around 8% a year “over the next several years”, despite fears that the low number of final investment decisions (FIDs) being taken on LNG projects could mean supply failing to keep pace with demand; since Qatargas 4 was approved in April 2007, just four LNG projects around the world have been given the green light.

Cook is confident in Shell’s ability to increase supply; the company aims to expand its LNG business at least in line with overall market growth.

The first of five new trains in development in which Shell has a share – the 4.8m tonnes a year (t/y) Train 5 at Australia’s North West Shelf project – is set for start-up this year. Construction of Sakhalin Energy’s 9.6m t/y two-train facility should be complete around end-2007, while the 7.8m t/y Qatargas 4 train remains on schedule to start up around the end of the decade. Shell also has an interest in Woodside Energy’s 4.8m t/y Pluto LNG project.

Shell’s LNG growth prospects took a setback recently after Malaysia’s Petronas comfortably outbid the company for a 40% stake in Santos’ Gladstone LNG development in Australia.

But Cook remains confident Shell will be able to put in competitive bids in the future: “We all bring something different. When oil’s above $100 a barrel, lots of companies have money. Shell’s value proposition is, in most cases, founded on the strength of our technology or what we can bring to the table commercially.”

Like other companies, Shell continues to suffer from severe cost inflation across its operations. But Cook suggests it is not being as badly affected as others. Average inflation across the Shell group is running at around 10% a year, compared with an industry average of around 20%, she says.

Those that think all they need to do is build an LNG-import terminal and the LNG will come are making a risky assumption – Linda Cook.
Finalists for the WPC excellence awards, 2008

Social Responsibility category:
For small to medium-sized companies:
* Overgas, Bulgaria (Tsvetelina Delcheva). Corporate Social Responsibility of Overgas
* Pro-Nam, International, Nigeria (Bill Knight). Promoting Multiple-Stakeholder Partnering for Better Governance, Development and Peace
For large companies:
* Chevron, US (Silvia Garrigo). Chevron’s HIV/AIDS programme
* Marathon Oil Corporation, Equatorial Guinea (Adel Chaouch). Bioko Island Malaria Control Project, Equatorial Guinea, Central Africa
* Petrobras, Brazil (Anamaria Ballard). Corporate Social Responsibility category: excellence awards, 2008 Finalists for the WPC

By Derek Brower

THE Rift between BP and its partners in the TNK-BP joint venture has deepened after the Russian shareholders declared a vote to re-elect the company board to be "illegal." Alfa-Acess-Renova (AAR), the Russian consortium that owns 50% of TNK-BP, said the company’s chief executive, Robert Dudley, had held the election last week without the consent of directors representing its half of the business. BP has rejected calls from Mikhail Fridman, who controls the Alfa Group, for Dudley to be sacked. The Russian shareholders accuse BP of treating TNK-BP as a subsidiary and preventing its foreign expansion. The dispute overshadowed a meeting last week between Russia’s president, Dmitry Medvedev, and officials from Brussels, with EU commissioners warning Moscow that the TNK-BP squabble could affect foreign investors’ perceptions of the country. At the meeting in Siberia, EU external affairs commissioner Benita Ferrero-Waldner said she had asked the Kremlin to smooth over visa problems for TNK-BP’s foreign workers. BP employees seconded to its Russian joint venture are still facing the termination of their work permits, with insurers saying the complications are part of AAR’s campaign to win control of TNK-BP. Russian authorities have also called in Dudley for questioning over alleged tax irregularities. EU trade commissioner Peter Mandelson also plunged into the dispute, saying AAR’s behaviour was “somewhat menacing” and raised fears about the operation of the rule of law, and the relationship of the state and its agencies to what should be purely private-sector business rules. Medvedev has pledged that the Kremlin would remain neutral in the dispute and has used a series of recent speeches to stress a new emphasis on the rule of law in Russia. The Kremlin also says state-controlled Rosneft and Gazprom should stay clear of the TNK-BP rift. Gazprom said recently it would be “interested in buying” a stake, but only after the conflict was resolved. Analysts say BP wants Gazprom to buy control of TNK-BP, leaving the UK company with a minority stake as part of a broader strategic venture with the Russian gas monopoly. Meanwhile, Gazprom has elected a former prime minister, Viktor Zubkov, 67, to replace Dmitry Medvedev as chairman. It also says it will become the world’s highest-valued company within the next seven to 10 years, and is targeting market capitalisation of $1 trillion.

By Derek Brower

RANDY Gossen was elected to serve a second three-year term as president of the World Petroleum Council at the Council’s annual meeting yesterday. The election means Gossen will lead the Council until the next congress, in Qatar in 2011. Talking to WPC News after the meeting, Gossen said he was “pleased to represent the Council for the next three years.” He added: “Most of what I do is building relationships, and building relationships is the key to the sustainability of the industry.”

The Council also discussed new regulations on reserves and resources guidelines. It welcomed a recent Securities and Exchange Commission announcement that oil sands can now be classified as reserves and that companies can talk to investors about probable reserves and file accounts based on a yearly average oil price as opposed to an end-of-year price.

Among other elections to the Council was Renato Bertani, from Brazil, to take charge of the WPC’s programme over the next three years, while Dinesh Kumar Pandey, from India, won an election to become vice-president of youth and gender. The Council also elected a new Youth Committee, which includes a 17-year-old, Pedro Baradun, from Uruguay.

Two new countries became members of the Council – Kazakhstan and Slovakia.

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TNK-BP dispute drags on

By Derek Brower

Randall Gossen returned as WPC president

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Social Responsibility Global Village (Stand 7460, Pavilion 7)

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Project presentations

BP: The Solar Power Technology Support Project to Agrarian Reform Communities (Spots Project)
CDA: Collaborative Learning Project
CNA: Corporate Engagement Project
Engineers Against Poverty (Engineer Against Poverty and Ameq): Working together to maximise the social benefits of the oil giant’s gas supply chain for oil and gas projects

Every Human Has Rights Campaign (EHHRC) – Club de Madrid
ExxonMobil (& Esso Angola): Investing in Education and Health in Angola
Gaia-Shell: Promover (Promote) – programme of socio-environmental capacity building and mobilisation
Ipieca: Human Rights Training for the Oil & Gas Industry

Marathon Oil: Bioko Island Malaria Control Project – Equatorial Guinea
Nexen: Water and sanitation project in Yemen
Petroleum: Carunha Viva
Repsol YPF: Red Cross HIV/AIDS Programme
Total: Repsol YPF

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2
Aconcagua, 22,841 feet.
So you’ll have an idea how deep we go in the pursuit of energy.
Investment problems pending

By Tom Nicholls

HOW HAS the credit crisis in financial markets affected the oil and gas industry? There has certainly been the odd wobble: late last year, London-listed Melrose Resources – predicting a significant rise in interest rates – called off a high-yield €250m ($380m) corporate bond offering, instead generating the financing through one of its bank credit lines.

In April, Imperial Energy, listed on London’s FTSE-250 index, announced a one-for-one rights issue, to raise £388m ($50.6bn) for project development in Russia, having failed to secure debt financing on acceptable terms. The issue was priced at a 42% discount to Imperial’s share price on the day before it made the announcement.

Imperial is not the only foreign firm operating in Russia to find it difficult to raise funds. Although banks still seem eager to finance Russian firms’ spending programmes, they appear increasingly reluctant to fund foreign companies’ operations because of unfavourable conditions in lending markets generally, high local taxes and concerns about the Russian authorities’ respect for sanctity of contract.

Meanwhile, in May, Indonesian oil and gas firm Medco Energi Internasional called off an initial public offering of Medco Global, its overseas unit. And the party on London’s Alternative Investment Market (Aim) – once a magnet for small exploration companies looking for financing because of its relaxed regulatory environment and easy access to capital – seems to be over. With investors’ appetite for risk falling as the cost of raising finance rises, Aim’s liquidity has dried up.

Where the exchange’s liberal company-reporting rulebook once attracted investors, now it is scaring them off. The result is that Aim-listed energy firms – particularly small exploration companies without production assets – are finding it significantly harder to raise funds than they did a few months ago.

But the credit crisis has, so far, had a limited effect on the ability of producers to finance projects. Given the healthy revenue streams that are generally on offer, energy ventures continue to attract project-finance – even if the cost of borrowing has risen, more loans are being syndicated and banks want to build into deals the freedom to tweak lending terms as market conditions demand.

There is a degree of reticence among certain financial institutions – some of whose balance sheets were damaged by the implosion of the US sub-prime mortgage market – towards the energy sector, meaning those that are still in the market can afford to be picky about which deals they back and on what terms. But well priced and well structured deals continue to be done, says John Martin, managing director, Standard Chartered.

The large appetite for upstream risk is yet to be tested to a significant degree, claims Bob Gillon, co-director of equity research at JS Herold, a consultancy. Indeed, many upstream companies have been increasing spending budgets, not reducing them – a reflection of higher-than-expected revenues and a desire to extract maximum profits while commodity prices are high.

Cost inflation

But the mood could easily shift. With upstream margins being eroded by cost inflation, the oil industry is less profitable than the seemingly relentless rise in crude prices would suggest. Some Middle East operations, for example, are understood to have experienced cost inflation of up to 50% over the last year or so. In addition, many governments have increased the state’s take from oil and gas projects, putting additional pressure on margins.

If commodity prices were to fall – or even stabilise – companies would struggle to maintain capital spending at present rates without recourse to the debt markets, especially because the energy sector’s capital-expenditure requirements are unusually large and run over several years.

Given the increases in the cost of borrowing, the fall in the appetite for risk and the reticence of some lenders, this might begin to affect the number of projects receiving finance. Smaller companies with capital-intensive projects would be at greater risk. But are oil prices likely to fall? Not really and, if they do, then not substantially. Considerable constraints on private-sector access to upstream resources suggest growth in non-Opec output will remain sluggish. Goldman Sachs has talked of a “super-spike” in oil prices to $150-200 a barrel over the next six months to two years on the basis that supply growth is inadequate.

Higher-than-expected oil and gas prices have also provided the energy sector with some protection against the turmoil in financial markets, enabling many firms to finance projects from cash flow or – thanks to high equity prices, themselves inflated by the commodity-price boom – by placing shares.

The bank has increased its forecast for WTI crude-oil futures in the second half of 2008 to $141/b, up from $107/b. Similarly, UBS has raised its forecasts for crude prices. It expects Brent to average $113.50/b in 2008, $120/b next year and $116/b the year after.

High oil prices may, therefore, continue to bankroll a considerable amount of investment in exploration and production (E&P). Yet, even if there is no shortage of cash, upstream expansion will remain constrained: E&P investment opportunities available to the private sector are limited and cost inflation has offset oil-price rises.

The shortage of rigs, equipment, services and labour are a further barrier to upstream activity. It all points to the persistence of an unsatisfactory rate of growth in production capacity, which will prove a sturdy pillar of support for oil prices over the coming years.

Uncertainty and volatility

Eventually, high oil prices may force a change in oil-consumption habits, perhaps easing some of the demand-side pressures that have pushed oil prices to record after record. There are some signs of that happening already. The oil-price boom has helped encourage investment in clean-energy schemes. New investment in green-energy ventures rose by around 60% last year to $148bn – way ahead of expectations – according to New Energy Finance, a consultancy. But growth in the sector seems to have slowed down. Uncertainty and volatility in financial markets are largely to blame.

But long-term risks to the sector’s success in the form of regulatory and political uncertainty are also threatening to deter investment, which needs reassurance that the large investments that need to be made in these emerging technological areas have a reasonable chance of long-term, sustainable profitability.

That reassurance must be achieved quickly – in the interests of the fight against global warming and the energy security that would result from a more balanced energy-supply system.
It’s the fundamentals, stupid – BP

By Alex Forbes

HIGH AND volatile oil prices are being driven primarily by market, economic and political fundamentals – rather than speculators, refining bottlenecks or the weakness of the dollar. That was the joint message from BP’s chief executive officer (CEO) Tony Hayward and chief economist Christof Rühl at the launch of the company’s Statistical Review of World Energy, 2008. Hayward said: “At least for the medium term, the era of cheap energy is over.”

Said Hayward: “Some people that put the rises down to short-term factors – so-called speculators, or the weakness of the dollar – but the reality is that this is about fundamentals: a very tight balance between supply and demand.”

Last year was the sixth consecutive year in which oil prices had risen, the first time this had happened since records began in 1861. Rühl added that, since January 2003, the world had seen cumulative price inflation of 300% for oil, 200% for traded coal and 100% for US gas, “all accelerating towards the end of the period”.

In the past five years, the global economy had grown more quickly than at any time since the early 1970s and supply had failed to respond adequately, he said. BP’s statistics show global oil production was down by 0.2% from 2006 to 81.53m barrels a day (b/d) in 2007. This decline, of 130,000 b/d, was the first since 2002.

Opec production fell by 300,000 b/d because of the cumulative effect of production cuts implemented in November 2006 and February 2007. Oil production outside Opec remained weak, rising by just over 200,000 b/d. OECD output fell for a fifth consecutive year. Russian production has recently begun to show year-on-year declines for the first time this decade.

Urging more investment to bring new supplies to the market, Hayward identified three significant obstacles: the overheated project-construction environment, resurgent resource nationalism and high taxes.

Demand, meanwhile, was strongest in nations that subsidise fuel prices, including China, India and many of the large oil-producing countries. Said Hayward: “All of the growth in oil consumption was concentrated in countries that subsidise prices. In the market economies of the OECD, consumption declined again in 2007, including in the US.” Global consumption grew by 1.1%, slightly below the 10-year average, to reach 85.22m b/d.

Hayward said that while gas prices had increased in most countries, “the increase in global gas prices has not kept pace with oil, with US gas last year trading at a record discount to fuel oil”. Gas consumption growth in 2007 was above average at 3.1%, with the world total reaching 2,922 trillion cubic metres.

Hayward’s third big theme was the positive message that the world is not running out of hydrocarbons. “The data in this review has shown that the world has ample reserves of oil, gas and coal.” But he warned investors that bringing those reserves into production was “a different matter” – largely because of adverse political factors, trade barriers and high taxes.

Hayward concluded that: “High oil prices are a wake-up call to all of us. The world urgently needs more energy investment . . . of all kinds: oil, natural gas, coal, nuclear energy and alternative energy. In short, we need all forms of energy, from all sources. And, equally as important, we need to focus on using the energy we consume more efficiently.”

19th WPC hosts first Poster Plaza

MADRID will see the launch of the WPC’s first Poster Plaza – an interactive computer-based presentation centre. Rather than showcasing conference presentations in static paper displays, as has been the case at past events, information will be presented in electronic format, the WPC says.

Sponsored by Petrobras, the Poster Plaza is split into four blocks, corresponding to the four elements of the technical programme – upstream; downstream and petrochemicals; natural gas and renewables; and managing the industry. Each block has six computers.

The Poster Plaza is in the Global Business Opportunity Centre, in Ifema’s Pavilion 7.

Meeting future demand will take more than just oil. We’ll need to tap every practical source of energy: from natural gas and coal to nuclear and renewables. But whatever the source, we’ll need technology to help us use it as efficiently and cleanly as possible.

The story continues at exxonmobil.com

19th WPC hosts first Poster Plaza
An expanding economy makes Spain an attractive downstream market

By Martin Quinlan

TWO DECADES of strong economic development have brought rapid expansion to Spain’s once-sleepy downstream business. Despite the large-scale introduction of natural gas, the oil-products market has grown by more than 70% in that time.

But refining capacity has not kept up. The country’s nine facilities provide a capacity of 1.33m barrels a day (b/d) – only 100,000 b/d more than 20 years ago. Products consumption in 2007 ran at 1.50m b/d, so refineries are operating full out and still there are imports.

Three companies operate refining capacity in the country, but Repsol YPF dominates. The firm’s five refineries give it 61% of total capacity, supplying 4,640 filling stations in Castellane and 5,000 others in Portugal. Repsol YPF claims a 42% share of the refined products market in Spain and 20% of that in the Portuguese market.

Cepsa’s three refineries – two on the southern coast and one in the Canary Islands – give the firm 31% of capacity, together with a number-two position in the market with over 1,700 filling stations in Spain and Portugal. Cepsa is 48.83%-owned by Total, although the companies market separately in Spain. In Portugal, the firms agreed in April to combine their filling stations under Cepsa’s management, to achieve 11% of the Portuguese market.

BP’s Castellene refinery supplies its network of 650 filling stations, giving the firm a Spanish market share of 11%.

After years focusing on the international upstream, Repsol YPF is eyeing its home market again. The firm includes three Iberian downstream projects in a list of 10 worldwide growth ventures on which it plans to spend €12.3bn ($19.6bn) over the years to 2012. The Cartagena refinery will see an investment of €3.2bn, the Somorrostro (Bilbao) refinery will see €0.7bn and €0.85bn will be spent on a petrochemicals expansion at the Sines refinery in Portugal.

The Cartagena project amounts virtually to rebuilding the facility by 2011, in what Repsol YPF claims is the country’s largest industrial investment ever. Distillation capacity will be doubled to 220,000 b/d and new units will be constructed to raise the conversion ratio to “one of the highest in the world”, the firm says.

When completed, more than 50% of the facility’s output will be middle distillates, mainly diesel. The two most important units will be a 53,000 b/d delayed coker and 30,000 b/d hydrotreater. Among the 30 new units will be a 60,000 b/d hydrosulphurisation plant and a 40 mega-watt cogeneration facility.

At Somorrostro, Repsol YPF is building a 36,000 b/d delayed coker, for start-up towards the end of 2010. A delayed coker is also planned for Tarragone, for start-up after 2012.

Vacuum distillation and hydrogen units at the new Cepsa refinery La Rábida will be optimised for diesel. The start-up, which has been calling for a larger share for some time.

The investments are designed to raise Repsol YPF’s topping capacity in Spain to 0.915m b/d in 2012 and to raise its conversion index for the country from 42% to 62%. The company forecasts the conversion increase will lift its refining margin in Spain by $3 a barrel above a typical Brent cracking margin.

Cepsa plans to increase its jet fuel and diesel production by 64,000 b/d, by early 2010, from its current production of 38,000 b/d. Cepsa’s expansion will total €1.65bn, of which La Rábida (the former ERT refinery, near Huelva) will account for €1.14bn.

La Rábida is to have a hydrocracker of 40,000 b/d capacity, making the largest contribution to the company’s target of raising middle distillates production by 1.39m b/d, in sharp contrast to crude distillation. At Gibraltar-San Roque, Cepsa is constructing new vacuum distillation and hydrogen units, costing €0.85bn to convert an existing heavy-gasoil hydrosulphurisation unit into a mild hydrotreater to produce low-sulphur diesel.

At Castellane in Spain and Portugal, €0.95bn will be spent on a petrochemicals expansion, with €0.85bn planned for Somorrostro, and still there are imports.

Another project being developed could see construction of a pipeline from either the Huelva or Sines port. Output will be optimised for diesel. The start-up target is end-2011.
The Spanish Organising Committee would like to extend a “Thank you” to the Sponsors of the 19th World Petroleum Congress for their support and commitment to this prestigious event.

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19TH WORLD PETROLEUM CONGRESS
The growing prospect of LNG shortages could start to destroy demand

By Alex Forbes

Gas buyers are losing confidence in the liquefied natural gas (LNG) sector’s ability to meet demand over the long term. As a result, they are increasingly likely to switch to other fuels, leaving the LNG industry facing a crisis of credibility.

In the past 16 months, there have been just three final investment decisions (FIDs) for gas-liquefaction projects: Pluto LNG in Australia (4.8m tonnes a year – t/y); the Skikda rebuild in Algeria (4.5m t/y); and Angola LNG (5.2m t/y). In the preceding 16 months, between the end-2005 sanction of Qatargas 4 and April 2007, one new project was approved: the 4.45m t/y Peru LNG plant.

Just 19m t/y of LNG capacity has been sanctioned in the past two-and-a-half years. And it is unlikely that many planned projects will achieve FID before year-end. Nigeria LNG train 7 – which at 8.5m t/y would be the world’s largest – is a contender, but approval in 2008 is far from certain.

Iran’s progress continues to be slow, especially after Shell’s and Repsol YPF’s recent decision to postpone Persien LNG. Gorgon LNG in Australia now looks like it may not be sanctioned until the year after next. Progress on Algeria’s Gassi Touil project is also far from certain, given its recent history.

The LNG industry’s sombre mood now is in sharp contrast to the high expectations that followed Qatargas 4’s FID in December 2005. According to one estimate at the start of 2007, it was expected that 14 projects in seven countries would receive FID over the course of the year, adding up to 70m t/y of capacity.

LNG capacity additions

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Source: Flower LNG

Cost of liquefaction plant

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<th>1990-95</th>
<th>New projects</th>
</tr>
</thead>
<tbody>
<tr>
<td>$ per t/y</td>
<td>1,400</td>
<td>1,200</td>
<td>1,000</td>
<td>800</td>
<td>600</td>
</tr>
</tbody>
</table>

Source: Flower LNG

It takes around four years from FID for a gas-liquefaction project to become operational. So it is no surprise that people are starting to wonder where incremental LNG supply will come from after 2010 to meet projected demand growth. Post-2012, the picture looks bleak for at least a couple of years, especially if demand continues to grow as forecast.

Despite a slow-down in some consuming economies, LNG demand growth is expected to remain strong, providing a backdrop of the fuel’s environmental advantage. Moreover, as distances between gas reserves and markets increase, LNG will become increasingly competitive with pipeline supplies, says Jon Chadwick, head of Shell Gas & Power in Asia. “Offshore, LNG beats pipeline gas over distances longer than 1,500 km. In 2005, driven by onshore terrain, LNG competes favourably with pipeline gas over distances greater than 1,800 km. Beyond that, LNG, over the terrain, is the better-cost choice.” On some trade routes, such as from the Middle East to North America or Japan, it is the only feasible option.

The supply/demand imbalance has already transformed the sector into a seller’s market – and the shift could hit many forecasts, which previously expected growth of 8-13% over the next decade. In 2013 and 2014, for example, more capacity would need to be commissioned than is expected in 2009, when three of the Qatari mega-trains are due to come on stream. Not feasible, says Andy Flower, of Flower LNG, a consultancy, especially as new capacity will have to come from countries other than Qatar, which has put a moratorium on further development of its North Field. Forecast of 13% are “fanciful”, he says.

More likely, predicts Flower, is growth at about half of today’s rate, at 4-5%/y beyond 2013. Even that would require the commissioning of three new trains every year. “The seller’s market is here to stay for the next decade at least,” Flower adds.

One problem is cost inflation. According to Cambridge Energy Research Associates (Cera), upstream project costs have almost doubled since 2005, driven by rising steel prices and higher oil prices. “The cumulative effect of tight capacity caused by high activity levels and high raw material costs is a near doubling, in two years, of capital required to build the same volume of facilities.”

And industry executives agree with Cera that the inflation hasn’t ended yet, either. When Petroleum Economist asked Total’s chief executive, Christophe de Margerie, Shell’s head of E&P, Malcolm Brinded, and Thierry Pilenko, head of EPC at Technip, how they saw the investment trajectory of the next few years, all said they expected costs to continue rising. “I think we’ll reach a plateau in the near future,” Pilenko, whose company is working with Chiyoda on the six LNG mega-trains in Qatar, says of a review of its projects that between 2003 and 2007 engineering costs rose by 8% a year, procurement by 24% a year and construction by 12% a year. “We certainly don’t see a plateau – we see continuous increase.”

According to Flower, the costs of LNG projects that have reached FID in the last two years fall in a wide range of $600-1,400 per t/y of capacity – three to five times the level of three to four years previously.

But a bigger problem, he says, will be securing sufficient gas supply to make projects viable: “Governments are increasingly questioning whether exporting gas as LNG, or indeed by pipeline, is the best solution for their country, or whether the reserves should be kept for domestic use. Even in Qatar, which will have 100 years of reserves even when it reaches 77m t/y (of LNG capacity), the argument is that these are the resources for future generations and that they have to be husbanded sensibly.”

It all adds up to a problem for the LNG sector. The sanctioning of Angola LNG at the end of 2007 may have been good news for the country – but the fact that it made headlines at all was because an FID on a new project has become such a rarity.

As Mohamed Hassan Marican, chief executive of Malaysia’s Petronas, said recently, if the sector can’t provide the comfort of supply, it will face the prospect of buyers turning to alternative sources for their energy. That would be a “credibility and reputation problem” for the industry.
Social Responsibility

Monday 30 June 2008

One village – one world

By Jim Shaw

S O C I A L responsibility (SR), once viewed as a do-good slide in many corporate presentations and reports, is now mainstream. For many, it has become a business imperative that builds and sustains a social licence to operate. The 19th World Petroleum Congress is the largest global event about people, energy needs for a better life, and the challenge the oil industry faces to deliver it in a socially responsible, sustainable and environmentally compatible manner.

SR Global Village

The SR Global Village, located in the Global Business Opportunities Centre (GBOC) in Pavilion 7, will showcase the oil and gas industry’s commitment to social, community and environmental initiatives worldwide. These interactive and informative exhibits will highlight projects developed jointly between non-governmental organisations (NGOs)/community and the petroleum industry that advance sustainability, human rights and co-operation to the benefit of society.

Among the Global Village’s featured topics is the celebration – this year of the 60th anniversary of the Universal Declaration of Human Rights (UDHR). The Every Human Has Rights (EHHR) campaign is looking to build awareness on a global level, uniting us as one human family, and one global village. It is hoped that 2008 can be the year that individuals, not just governments, commit to the principles of the UDHR for themselves. Visit the EHHR stand in the Global Village or check it out for yourself on line at: www.everyhumanhasrights.org.

The Global Village is made up of 12 multi-media stands that ring a central networking area where fair-trade refreshments will be available to delegates and visitors at no cost. In one area of the Global Village is the “speaker’s corner”. Here, visitors can listen and unlock the best-practice lessons from a host of exciting partnership projects and topics that will be explored in greater detail throughout the Congress. A detailed agenda of daily presentations and speakers will be available at the Global Village and published in the Congress daily newspaper.

Featured projects at the Global Village will include:

* BP: Solar Power Technology Support Project (Southern Philippines);
* CDA Collaborative Learning Projects: Corporate Engagement Project (CEP);
* Engineers Against Poverty and Amec: Maximising social benefits in the engineering supply chain for oil and gas projects;
* ExxonMobil (and Esso Angola): Investing in Education and Health (Angola);
* Gaia-Shell: Promover (Promote) socio-environmental capacity building and mobilisation programme (Brazil);
* International Petroleum Industry Environmental Conservation Association (Ipieca): Business and Human Rights training for the oil and gas industry;
* Marathon Oil: Biosko Island Malaria Control Project – (Equatorial Guinea);
* Petrobras: Carnaubia Viva community-based sustainable business enterprise (Brazil);
* Repsol YPF: Red Cross HIV/Aids programme (Trinidad and Tobago);
* Nexen: Sustainable water and sanitation project (Yemen);
* Total: Stakeholder relationship management;
* Total: HIV/Aids prevention programme for transient workers (Morocco);
* Every Human Has Rights: Celebrating the 60th Anniversary of the Universal Declaration of Human Rights.

An excellent opportunity

The SR Committee 19th World Petroleum Congress encourages you to take advantage of what is clearly an excellent opportunity to learn first hand from distinguished guests, NGOs, community and industry partners how even one simple act can bring about big change.

Jim Shaw is chair of the 19th World Petroleum Congress SR committee.

Coral Reef, Islas del Rosario, Cartagena, Colombia

Nobody can do everything, but everyone can do something

The 19th World Petroleum Congress programme will include a special two-hour session on 1 July 2008 dedicated to issues dealing with SR. These include human rights, societal expectations and stakeholder engagement. This special session will feature a panel of distinguished global experts representing the NGO community, academia, government, special interests groups, and the oil and gas industry.

“In this moderated session, you will hear from leading experts how healthy relationships and proactive planning can make a difference and reduce risk, ultimately saving you time and resources,” says Jim Shaw, chair of the 19th World Petroleum Congress SR committee.

The session’s aim, says Shaw, is to “raise the awareness of human rights in both a local and international context; provide greater insight into the role of government and the UN, and communicate the business case for sustainable and socially responsible solutions.”

Moderator: Lionel Jospin, former Prime Minister of France and member of Club de Madrid. Speakers: Sidney Brown, senior director of international law, policy and campaigns, Amnesty International, UK; Georg Kell, executive director, UN Global Compact; Richard Lanaud, chairman of the ethics committee, Total; Rilwanu Lukman, former secretary-general of Opec; and Victor Pérez-Díaz, Sociologist, Spain.

Social Responsibility
Uncertainty in the air

Petrochemicals feedstock prices are rising fast and world demand is slowing

By Martin Quinlan

The worldwide chemicals business had four strong years to 2007, with demand and prices being driven by growing economies in lead-
ing economies. But this year’s escalating oil prices, pumping up the costs of feedstocks and process energy, have put a squeeze on margins. If demand should falter – perhaps as a result of the banks’ credit problems – the industry is likely to find itself with surplus capacity and the next down-cycle would loom.

The chemicals business is notoriously cyclical, with strong growth in the up-cy-
cles, leading consumption to ease further on the back of rising crude prices. Meanwhile, “the heavy burden of feed-
stock costs” intensified at the start of the year, with prices for naphtha – the main feedstock in Europe and Asia – climbing 10% in 2008 and 3.3% in 2009 and 2010.

Middle East construction

In the present cycle, the construction fo-
cus is in the Middle East. According to Mohamed Al-Mady, chief executive of Saudi Arabia’s Sabic, “the world’s largest programme ever for construction of new ethylene plants” is under way in the re-
gion. He forecasts that Middle East ethyl-
ene capacity will more than double over five years, from 13m tonnes a year (ty) in 2007 to 29m ty in 2012 – the growth rep-
resenting nearly half of worldwide capac-
ity growth in that period.

The Middle East is riding a petrochemi-
cals boom, driven by its new axis with China. Producers in the region are well-
placed geographically to supply China’s rapidly expanding markets and they bene-
fit from considerable cost advantages. The Middle East producers mostly use gas for process energy and ethane (extracted from gas) as feedstock for ethylene production. While their gas is supplied at low cost – in Saudi Arabia, as little as $0.75/m Btu – their ethylene is sold at world prices, which reflect the high costs of feedstock in the US and western Europe.

The Middle East has very large margins, which can be large enough to pay for a new eth-
ylene cracker in less than three years. Ac-
cording to the chemicals analysts at Deut-
sche Bank, the Middle East cracker run-
ning on Saudi ethane gave a margin of over $800/ty last year and is estimated to achieve over $900/ty this year. The return-on-investment (RoI) for an integrated ethylene and high-density polyethylene facility in Saudi Arabia was over 50% last year, ris-
ing to 60% early this year.

Deutsche Bank lists nine ethylene projects, with a combined capacity of 8.6m ty, due for start-up this year – all in the Middle East, with the exception of South Ko-
rea. Next year, 10 projects with a capacity of 9.2m ty are due for start-up, of which five will be in China. The bank identifies projects with a total capacity of 41.6m ty as likely to come on stream over the next five years or so, representing a rise of a third over existing capacity.

But the effect of this year’s new capac-
ty will be to set-off a down-cycle. “We expect the ethylene cycle to transition through second-half 2008 to a clear down-
turn by 2009, driven by new Middle East-
ern and Chinese investments,” Deutsche Bank says. New capacity will drive world-
wide utilisation rates for ethylene down be-
low 90% next year, it forecasts. Although 2009 is seen as the start of the downturn, the bank says customers might de-stock in advance of it – “which could pull forward the downturn by second-half of 2008”. The UK’s ChemSystems, part of the Nexant consultancy, is also forecasting trouble in 2008. “Petrochemicals demand growth generally eased at the start of 2008 as slowing consumption in construc-
tion spread to other industry sectors,” the firm notes. Buyers have been reluctant to take large volumes of products for fear of being stranded with over-valued invento-
ries, leading to consumption being cut.

Meanwhile, “the heavy burden of feed-
stock costs” intensified at the start of the year, with prices for naphtha – the main feedstock in Europe and Asia – climbing further on the back of rising crude prices. ChemSystems says use of naphtha slowed down because cracker operating rates were cut in response to lower margins. Opera-
tors with feedstock flexibility switched to liquefied petroleum gas (LPG) feedstock to take advantage of the price difference – LPG prices typically fall towards the end of the northern hemisphere winter when the peak heating demand is passed. In June, naphtha was selling at over $1,000/ty in northwest Europe – up from a little under $700/ty a year previously and from a long-run average of about $250/ty up to 2005. Naphtha prices are always highest in Japan: in June, they exceeded $1,100/ty, up from $740/ty a year ago.

But a trade-off is that crackers running naphtha feedstock produce a wider range of products than crackers running gas. A typical naphtha yield is 35% of ethylene, 16% of propylene and 49% of other hydrocarbons, while cracking ethane yields 78% of ethylene, 2% of propylene and only 20% of other hydrocarbons. Accord-
ingly, the economics of naphtha crackers are less dependent on the markets for eth-
ylene and derivatives because there are greater revenues from co-products.

This is good for the western European producers because naphtha cracking pre-
dominates in the region. In contrast, US cracking capacity is overwhelmingly gas-
based – the explanation is that naphtha has always been in high demand in the US as a blending component for gaso-
line, while gas-derived feedstocks have been readily available from the country’s large natural gas production. The western Euro-
peans have also benefited from the de-
cline in the value of the US dollar against the euro, which has made the rising naph-
tha price more tolerable.

But with its gas-based crackers and high gas prices, the US is increasingly disadvantaged. The outcome, says Deut-
sche Bank, is that the US “will become a net importer of ethylene derivatives and finished goods early next decade”. Pro-
duction costs for ethylene are 10 or 11 times higher at facilities on the US Gulf Coast than in the mid-East Gulf, the bank estimates. Accordingly, US producers – “Dow has been particularly aggressive,” Deutsche Bank says – have been moving to the Middle East, and to Malaysia, to take advantage of lower feedstock prices. There is no doubt as to where demand-growth will be concentrated. In April, Jim Harris, senior vice-president at Exxon-
Mobil Chemical, updated the firm’s fore-
cast for Asian growth: “We expect some 60% of the increase in global petrochem-
icals demand over the next 10 years will occur in Asia. China alone will account for nearly 40% of that growth. By 2015, Asia could account for 50% of global de-
mand for commodity chemicals. China could account for 25%.”

In 2007, BASF says worldwide produc-
tion of chemicals (excluding pharmaceuti-
cals) increased by 3.1% compared with the previous year – but the increase was 8.8% in Asia (excluding Japan, where there was a contraction of 2.0%). The US saw growth of only 0.1%, while the European Union achieved 2.2% and South America achieved 4.5%. BASF remains optimistic, forecasting growth in production of 2.8% in 2008 and 3.3% in 2009 and 2010.

Average return on chemicals assets, %

<table>
<thead>
<tr>
<th>Year</th>
<th>2000</th>
<th>2001</th>
<th>2002</th>
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<th>2004</th>
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<tr>
<td>Chemicals companies</td>
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<td>4</td>
<td>1.9</td>
<td>5.7</td>
<td>7.2</td>
<td>6.7</td>
<td>6.5</td>
</tr>
<tr>
<td>Western Europe-based</td>
<td>3.3</td>
<td>8.5</td>
<td>6.7</td>
<td>5.3</td>
<td>6.8</td>
<td>5.2</td>
<td>6.1</td>
<td></td>
</tr>
<tr>
<td>US-based</td>
<td>5.3</td>
<td>4.9</td>
<td>2.1</td>
<td>3.4</td>
<td>6.8</td>
<td>9.1</td>
<td>7.4</td>
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<tr>
<td>Oil companies</td>
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<td>3</td>
<td>4.2</td>
<td>12.6</td>
<td>13.8</td>
<td>17.3</td>
<td>17.4</td>
</tr>
<tr>
<td>Sector total</td>
<td>5.2</td>
<td>5.4</td>
<td>2.1</td>
<td>6.2</td>
<td>9.6</td>
<td>11.4</td>
<td>10.9</td>
<td></td>
</tr>
<tr>
<td>Share of oil companies’ earnings derived from chemicals sector</td>
<td>6.2</td>
<td>2.5</td>
<td>6.2</td>
<td>2.5</td>
<td>7.3</td>
<td>6.1</td>
<td>6.2</td>
<td>6.6</td>
</tr>
</tbody>
</table>

Note: 2006/07 figures taken from 2008 survey; earlier figures are from previous surveys.

Average return on chemicals assets, 1985-2007
US oil sheds macho image

Given the shortage of skilled labour, oil companies cannot afford to ignore half the population

By Anne Feltus

The business case for recruiting more women to the oil industry has become irreletable. Largely because of lay-offs and reduced recruiting efforts in the 1980s, the oil and gas industry’s workforce is ageing and a large percentage of its employees are approaching retirement. At the same time, the historically male-dominated business has become larger, more costly, competitive and complex, and demand has grown for competent workers – regardless of sex.

As a result, oil firms have tried to make the workplace more enticing for women and to support their personal and professional development. “Chevron has a number of programmes in place to help it balance work and home responsibilities,” says Lindsay Laskowski, a liquefied natural gas process engineer for Chevron Energy Technology. "We have flexible work schedules and other options, such as telecommuting and alternative work locations, that can help employees achieve the right balance. Our employee assistance programme also provides guidance on family, child care and elder care.”

Women’s internal support networks provide a platform for helping women maximise their potential in the workplace. Kelly McGuire, a field engineer for ExxonMobil Pipeline, belongs to a women’s group at her company that meets monthly to network, hear an outside speaker or participate in a volunteer event. "We’re getting a lot of support from upper management to recruit and retain women in our workforce,” she says. For example, the group has just started a mentoring programme to help female employees break through some of the barriers that remain from the industry’s “good old boy” days.

The growing number of women who have already made it to the top rungs of the corporate ladder not only serve as mentors, but also provide role models for others. An example is Cathy Lamboley, who recently retired as senior vice-president, general counsel and corporate secretary of Shell Oil. The first general counsel of a major in the US, Lamboley not only supported the development of women within Shell through such activities as

Some energy firms’ efforts to recruit, retain and train women have been recognised as exemplary

...and on giving women greater opportunities

...would require in offshore situations or in particular countries for example. But this has changed. Today the right person, regardless of gender, is sent to the job.”

But while progress has been made, women have not caught up with their male counterparts. According to the most recent US Equal Employment Opportunity Commission statistics, women accounted for only 31.4% of the total employee base, 17.6% of officials and managers and 32.3% of professionals in crude petroleum and natural gas extraction in 2005. Barriers still exist, especially because of the difficulty in balancing professional and personal priorities in a business that often involves long hours, extensive travel or relocation.
A difficult trajectory to climate-change pact

By Ian Lewis

The new global climate-change pact – due to be signed in Copenhagen in late 2009 – was never likely to include commitments by the biggest polluters to large, short-term reductions in carbon dioxide (CO₂) emissions. Recent comments by officials from large energy producers have done little to dispel this view.

Russia has indicated it’s not prepared to jeopardise economic growth by agreeing to large emissions reductions as part of a successor agreement to the Kyoto Protocol. Vsevolod Gavrilov, the official in charge of Russia’s Kyoto obligations said in April that Russia would not support any charge of Russia’s Kyoto obligations to emissions-reductions targets.

Russia’s reluctance to countenance caps in the near term puts it in the same camp as China, the US, the EU and India – the other main carbon emitters. China re-as China, the US, the EU and India – the other main carbon emitters. China recently surpassed the US as the largest emitter overall, according to research at the University of California, although the US still out-pollutes China more than fivefold on a per capita basis.

The US view of efforts to fight climate change has mellowed in recent years, after the government’s acknowledgement in 2007 that human activities played a part in warming the planet. Nevertheless, US policy generally remains ambiguous and unambitious when it comes to emissions-reductions targets. This is unlikely to change until after the November 2008 presidential election. In April, President George Bush did outline a new national goal of stopping the growth of US greenhouse-gas emissions by 2025, although this proposal was criticised by opponents for being inadequate and voluntary. That his government will play little part in implementing such measures in its little remaining time in office also blunted the impact of Bush’s remarks.

An idea of what a Democrat in the White House might mean for climate-change policy was contained in a proposed energy package unveiled by Democrats in the US Senate in early May. Headline measures include the removal of an estimated $17bn of tax breaks to big oil companies and the imposition of a 25% windfall profits tax on companies that fail to invest in new energy sources. The Democrats feel there is growing support for such measures at a time when gasoline prices have reached record levels, triggering allegations of profiteering by oil companies. And with pump prices unlikely to fall significantly in the foreseeable future, policy aimed at promoting alternatives to fossil fuels – whether motivated by the need for energy security, the climate-change agenda or both – seems certain to become more common.

A Republican administration in 2009 is also likely to be a more willing partner in global climate-change talks than the present government, given likely nominee John McCain’s track record – he co-authored a bill to reduce CO₂ emissions by 65% by 2050 and is a proponent of greater use of energy-efficiency measures.

Whatever issues confront negotiators at climate-change talks none is likely to be thornier than assessing the role that should be played by biofuels in reducing hydrocarbons used in transport fuel. Touted by governments in the US and Europe as an important weapon in combatting climate change – and keeping domestic farmers’ lobbies happy – the sector’s efficacy remains under intense scrutiny. The amount of land taken up by biofuels crops is blamed by some for contributing factor to food-price rises, while its overall carbon emissions benefits have been questioned.

Stavros Dimas, the European Union’s environment commissioner, has once more emphasised the “crucial importance” of sustainability issues, as the bloc seeks to hit a target of ensuring that 10% of road-transport fuel come from biofuels by 2020. The effects of social criteria were not taken into account when Brussels decided on the target in January, but pressure is now mounting for their inclusion, given the possibility of hardship and unrest resulting from any future food shortages.

Meanwhile, leading Republicans on the House Energy and Commerce Committee in the US Congress have suggested that plans to boost biofuels use fivefold in the US by 2022, by setting mandatory targets, should be scaled back or even scrapped.

Whatever issues confront negotiators at climate-change talks none is likely to be thornier than the role of biofuels.

Youth stand timetable (Stand 7260, Pavilion 7)

Tuesday 1 July

11:00-12:30 TECHNOLOGY SHOWCASE TOUR
- Tour around World Petroleum Exhibition and the Global Business Opportunities Centre
- Participating companies: StatoilHydro, exploration; Petrobras, production; Chevron, transportation; Repsol YPF, Refining

11:30-12:30 PROFILES
- Would you like to know what a Petroleum Engineer is? OR Research Engineer?.....

12:30-13:00 DEBATE PRESENTATION
- Future of Industry: Rolf Wiborg, senior advisor, NPD

Wednesday 2 July

11:00-12:30 TECHNOLOGY SHOWCASE TOUR
- Tour around World Petroleum Exhibition and the Global Business Opportunities Centre
- Participating companies: Weatherford, exploration; Total, production; Chevron, transportation; BP, refining

11:30-12:00 YOUTH AWARDS CEREMONY
- Second and third youth awards: Juan Bachiller, vice chair Spanish Organising Committee

12:00-12:30 STRASBOURG YOUTH FORUM PRESENTATION
- European Youth Forum in Strasbourg, in 2009

12:30-13:00 DEBATE PRESENTATION
- HR SHORTAGE: Maria Antepara and Eusebio Elies, Tecnicas Reunidas

14:30-15:00 DEBATE PRESENTATION
- PREVIEW YOUTH SESSION: Leor Rotchild, senior analyst, Nexen, and secretary of the WPC Youth Committee

15:00-16:30 TECHNOLOGY SHOWCASE TOUR
- Tour around World Petroleum Exhibition and the Global Business Opportunities Centre
- Participating companies: StatoilHydro, exploration; Petrobras, production; RasGas, transportation; Repsol YPF, Refining

15:30-16:00 DEBATE PRESENTATION
- Social Responsibility: Izeusse Braga, Petrobras

17:00-17:30 DEBATE PRESENTATION
- Eyes on the Horizon: Engaging, motivating, and developing energy industry young professionals. Josh Etkind, Shell

Thursday 3 July

11:00-12:30 TECHNOLOGY SHOWCASE TOUR
- Tour around World Petroleum Exhibition and the Global Business Opportunities Centre
- Participating companies: CNPC, exploration; Schlumberger, production; RasGas, transportation; BP, refining

11:30-12:30 PROFILES
- Would you like to know what a Refining Planning Engineer is? OR Reservoir Engineer?.....

12:30-13:00 DEBATE PRESENTATION
- Challenging conditions

14:30-16:30 YOUTH SPECIAL SESSION
- Does the Petroleum Industry Need an Image Maker?
- Industry speakers: Andrew Gould, Schlumberger; Jorge Sergio Gabrielli, Petrobras; Rich Paterson, PricewaterhouseCoopers;
- Youth Panel: Pedro Martinez Conesa, Repsol YPF; Maria Carolina Izeusse Braga, Petrobras
- Moderator: Leor Rotchild, and Youth Committee secretary
An unconventional approach

The US’ shale-gas resource will play an increasingly important role in meeting the country’s gas demand

by Anne Feltus

US SHALE-gas reservoirs may contain up to 780 trillion cubic feet (cf) of gas, according to the Gas Technology Institute, a not-for-profit US research and development organisation for the gas industry. That figure may even be on the conservative side: Schlumberger estimates the resource potential from the country’s 19 shale-gas basins at 450,000 trillion cf.

In view of recent increases in gas prices and the US’ emerging gas deficit, an increase in the number of operators focusing on gas production from shale, the earth’s most common sedimentary rock, is to be expected. The exploitation of US shale-gas plays has increased by 30-50% over the past two years, but development has been limited; the low permeability of these fine-grained formations significantly reduces gas-recovery rates, making shale-gas production unprofitable when prices are low.

Technologies such as hydraulic fracturing and horizontal drilling have enabled operators to improve recovery rates and recent increases in gas prices have significantly improved the economics of using these technologies, attracting greater investment, particularly from medium-sized and large independents.

The Barnett Shale play has attracted the most attention. An estimated 30 trillion cf of gas lie trapped up to 8,000 feet below the surface, in a reservoir covering about 5,000 miles of the Fort Worth basin in north-central Texas. Production from the formation amounts to about 3.5bn cf/d equivalent – 7% of US gas output – says Steve Hadden, senior vice-president of exploration and production at Devon Energy.

Between 2000 and 2007, operators drilled almost 4,200 horizontal wells in this formation, including 3,700 in the primary development area, where most wells have an estimated recovery of 2.5bn-15bn cf equivalent. Hadden says. Results, he adds, are improving in the emerging area of the play to the east of the primary site. This new area was first opened by Bex.getError(33x306) Shale, which, claims Hadden, “has given us a very strong position in the very best part of the field”. Devon now plans to focus on Barnett: it has acquiring more than 0.726m acres in the play, including 0.525m acres in the primary development area, which lies adjacent to highly urbanised Fort Worth. The company has drilled almost 1,300 wells to date and says equivalent net production should reach 1bn cf/d during the second quarter of 2008.

Other shale-gas reservoirs also have received attention. The Woodford Shale play in southeast Oklahoma is emerging as one of the most significant gas formations in the US Midwest. Newfield Exploration is the most active driller in the region, which represents the fastest-growing component of the company’s portfolio, says chief executive David Trice.

According to its 2007 annual report, Newfield increased its Woodford Shale acreage by 35,000 net acres to 165,000 net acres and its gross operated production from the area to around 170m cf/d – triple its total at the end of 2005. Newfield says there is considerable upside: it claims its Woodford Shale acreage could enable it to double its proved reserves and will spend more on the region in 2008 than anywhere else.

Five years ago, a Southwestern Energy subsidiary made the first commercial gas discovery in the Fayetteville Shale in Arkansas. Production from the area, which lies adjacent to highly urbanised north-central Arkansas, is to be doubled by the year-end 2008.

Meanwhile, Oneok Partners has agreed a joint venture with Williams to build a 120m, 100,000 b/d NGLs pipeline connecting the Piceance basin to the proposed Overland Pass Pipeline, which will extend from Opal, Wyoming, to the Mid-Continent NGLs hub in Conway, Kansas.

Activity picks up in the Piceance basin

By Anne Feltus

ALMOST 30 years after Exxon shut down its $5bn, 1,000 acre operation in northwestern Colorado’s Piceance basin, its interest in the region has been rekindled. But this time the price is lower, between 6,000 square-mile basin’s gas reserves.

ExxonMobil has about 300,000 acres under lease in the basin, which contains as much as 100 trillion cubic feet (cf) of gas reserves. But much of the gas lies trapped in sandstone that is highly impermeable and buried up to 16,000 feet underground. Exposed gas reserves. But much of the gas lies trapped in sandstone that is highly impermeable and buried up to 16,000 feet underground.

The exploitation of US shale-gas plays has increased by 30-50% over the past two years, but development has been limited; the low permeability of these fine-grained formations significantly reduces gas-recovery rates, making shale-gas production unprofitable when prices are low.

Technologies such as hydraulic fracturing and horizontal drilling have enabled operators to improve recovery rates and recent increases in gas prices have significantly improved the economics of using these technologies, attracting greater investment, particularly from medium-sized and large independents.

The Barnett Shale play has attracted the most attention. An estimated 30 trillion cf of gas lie trapped up to 8,000 feet below the surface, in a reservoir covering about 5,000 miles of the Fort Worth basin in north-central Texas. Production from the formation amounts to about 3.5bn cf/d equivalent – 7% of US gas output – says Steve Hadden, senior vice-president of exploration and production at Devon Energy.

Between 2000 and 2007, operators drilled almost 4,200 horizontal wells in this formation, including 3,700 in the primary development area, where most wells have an estimated recovery of 2.5bn-15bn cf equivalent. Hadden says. Results, he adds, are improving in the emerging area of the play to the east of the primary site. This new area was first opened by Barnett Shale, which, claims Hadden, “has given us a very strong position in the very best part of the field”. Devon now plans to focus on Barnett: it has acquiring more than 0.726m acres in the play, including 0.525m acres in the primary development area, which lies adjacent to highly urbanised Fort Worth. The company has drilled almost 1,300 wells to date and says equivalent net production should reach 1bn cf/d during the second quarter of 2008.

Other shale-gas reservoirs also have received attention. The Woodford Shale play in southeast Oklahoma is emerging as one of the most significant gas formations in the US Midwest. Newfield Exploration is the most active driller in the region, which represents the fastest-growing component of the company’s portfolio, says chief executive David Trice.

According to its 2007 annual report, Newfield increased its Woodford Shale acreage by 35,000 net acres to 165,000 net acres and its gross operated production from the area to around 170m cf/d – triple its total at the end of 2005. Newfield says there is considerable upside: it claims its Woodford Shale acreage could enable it to double its proved reserves and will spend more on the region in 2008 than anywhere else.

Five years ago, a Southwestern Energy subsidiary made the first commercial gas discovery in the Fayetteville Shale in Arkansas. Production from the area, which lies adjacent to highly urbanised north-central Arkansas, is to be doubled by the year-end 2008.

Meanwhile, Oneok Partners has agreed a joint venture with Williams to build a 120m, 100,000 b/d NGLs pipeline connecting the Piceance basin to the proposed Overland Pass Pipeline, which will extend from Opal, Wyoming, to the Mid-Continent NGLs hub in Conway, Kansas.

Activity picks up in the Piceance basin

By Anne Feltus

ALMOST 30 years after Exxon shut down its $5bn, 1,000 acre operation in northwestern Colorado’s Piceance basin, its interest in the region has been rekindled. But this time the price is lower, between 6,000 square-mile basin’s gas reserves.

ExxonMobil has about 300,000 acres under lease in the basin, which contains as much as 100 trillion cubic feet (cf) of gas reserves. But much of the gas lies trapped in sandstone that is highly impermeable and buried up to 16,000 feet underground. And the hydrocarbons are not in long, continuous layers, but in thou-

ths of isolated pockets that are separated by layers of shale.

Producing from this basin in the heart of the Rocky Mountains requires expensive – and expensive – fracturing to open the rock and producing zones with the well bore. After a decade of research and development, ExxonMobil recently introduced its proprietary Multi-Zone Stimulation Technology (MZST), which it claims improves the economics of producing from gas-saturated sandstone.

While conventional procedures require two to three weeks to complete a handful of high-quality fractures in a well, MZST enables operators to crack open dozens of zones in just a few days. This reduces costs and boosts production by allowing zones to be fractured that would not be economic using conventional fracturing techniques.

ExxonMobil is phasing in the project over a period of years and will gradually increase production from 55m cf/d. Ultimately, it expects to recover almost 35 trillion cf of gas from the Piceance basin. While ExxonMobil only recently returned to the Piceance basin, others have been building their portfolios for some time. Indeed, production in the region has been rising by around 20% a year, making it one of the most active areas in the US gas business.

EnCana entered the Piceance basin in 2001. Its 3,000 foot-thick gas accumulations of the Williams Fork are believed to contain 90-95% of the Piceance basin’s reserves. The firm drilled 286 net wells in 2007, up from 220 the previous year. Its plans call for drilling about 700 wells more during the second quarter of 2008.

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North Sea drilling hits 10-year peak

By Martin Quinlan

O n the UK’s day of peak oil production, 116bn cm/y by 2011. The Norwegian Petroleum Directorate (NPD) forecasts that production will rise to 236.4bn cubic metres (cm), although it is likely that more than half of this will be produced if temperatures had been colder.

By pipeline to the Djéno terminal.

Deep-water start-up marks an upturn for Congo

By Martin Quinlan

FIRST OIL in late April from the deepest-water field in Congo (Brazzaville), Total’s Moho-Bilondo, should mark an upturn in oil prospects. Output will lift the country’s total production – 222,000 barrels a day (b/d) in 2007 – by 90,000 b/d in 2010, try’s total production – 222,000 barrels a day (b/d) in 2007 – by 90,000 b/d in 2010, to 236.4bn cubic metres (cm), although it is likely that more than half of this will be produced if temperatures had been colder.

Meanwhile, the less-mature Norwegian waters yielded 12 discoveries last year of which eight were in the North Sea, near existing infrastructure – showing the success of the government’s initiatives to promote drilling near existing platforms. Only two of the country’s smaller operators – Lundin and Pertra (now part of DNO) – had successes, all of the other discoveries were operated by StatoilHydro.

Of the frontier discoveries, StatoilHydro’s Nucula gas and oil find in the Barents Sea, just off North Cape, is claimed to have shown that a functioning petroleum system exists to the east of Snefnut and Goliat, but the find was not tested. StatoilHydro also made two gas finds and one of condensate in the Norwegian Sea. According to the NPD, the year’s drilling found 245m 522m barrels of recoverable oil and 15bn 230m cm of gas. At the mid-points, the discoveries replaced over 40% of the year’s oil production and 20% of gas production.

The North Sea’s other two sectors saw slack years for exploration work. Off the Netherlands, there were only five exploration wells – and two of them were unsuccessful. In Danish waters, only one exploration well and two appraisals were drilled, with unexciting results. Mærsk abandoned one well at the beginning of this year, but plans soon to drill another in the Gita area.

OIL PRODUCTION in the UK, Norway, Netherlands and Denmark declined by 4.9% last year to 4.502m barrels a day (b/d), according to official figures compiled by Petroleum Economist – a rate of decline significantly lower than that of the previous two years. Gas production declined by 3.6% to 23.4bn cubic metres (cm), although it is likely that more than half of this will be produced if temperatures had been colder.

A high level of offshore activity checked the UK’s long-term oil-production decline, with output risinf by 0.3% to 1.578m b/d. Norway saw an 8.0% decline to 2.557m b/d, and Denmark struggled to produce 312,000 b/d. The Netherlands saw a significant increase to 70,000 b/d, following the start-up towards the end of 2006 of Petro-Canada’s P11b field, which now counts formally half of the country’s oil production.

UK gas production continued its rapid decline, falling by 9.5% to give a total of 70.4bn cm. Norway’s output growth moderated to 2.4%, to 89.7cm b/d – but the Norwegian Petroleum Directorate (NPD) forecasts that production will rise to 116bn cm/y by 2011. The Netherlands production declined to 68.3cm b/d, reflecting the country’s substantial gas imports. Exploration and appraisal drilling was up, from the 114 wells of 2006 to 153 in 2007 – the largest total since 187 wells were drilled in 1997. The UK provided most of the increase, with 111 wells drilled, against 70 in 2006. The large number of UK appraisal wells – 77, up from 41 the previous year – is evidence of the trend to prove-up reserves quickly, to implement rapid, if small-scale, development projects and to take advantage of high oil prices. The government’s Department for Business, Enterprise and Regulatory Reform (DBERR) says 41 of the 77 were sidetracks, up from 17 of now 41 appraisals in 2006.

Drilling yielded nine “significant” discoveries, said the DBERR. The stars were two west-of-Shetland discoveries: Total’s Tormore, a gas and condensate find lying 15 km from the firm’s Laggar field, and BP’s Southwestern Field. StatoilHydro’s Nucula gas and oil find, made just 11 km from the floating production, storage and offloading vessel on its Foinaven field.

One of the less-mature Norwegian offshore sees a more measured pace of work. Appraisal wells continue to be outnumbered by exploration wells – but there were increases in both last year and the total, 32, is historically high. Three wells were drilled in the Barents Sea, nine in the Norwegian Sea and 20 in the North Sea.

The NPD forecasts that there will be another increase in drilling this year, to a total (exploration and appraisal) of 35-40 wells, but much depends on availability of the top-of-the-range rigs needed for the country’s deeper-water developments. StatoilHydro will operate about half of the total.

DCM Petroleum Development Limited, operator of Block 2/14, offshore Scotland, has announced a discovery in Block 2/14, which has been named “Cold Break”. The discovery is situated at approximately 1,000 miles (1,500 km) to the north of the UK, and is estimated to contain a minimum of 300 million barrels of recoverable oil.

Good start for Eni in Angola

By Martin Quinlan

ENI HAS made an oil discovery with its first well in Angola’s Block 15/06 – the deep-water area, relinquished by ExxonMobil, for which Eni and partners paid a signature bonus of $0.902bn in 2006. The firm did not give the test result, but it said the well flowed “greater quantities than expected” of crude of over 30ºAPI.

The Sangos-1 well, drilled in 1,349 metres of water, found an oil column of 127 metres in sands of high permeability. “Field dimensions and results are better than estimated,” Eni said. The firm plans to drill more wells in “surrounding high-potential areas,” with the aim of finding structures for a multi-field development in the western part of the block.

Block 15/06, offered in the 2005 licensing round and awarded in May 2006, was the compulsory-relinquishment part of Block 15, where ExxonMobil produces nearly 0.7bn barrels a day (b/d). Block 15 holds 17 discoveries, with reserves estimated by the operator at 4.5bn barrels of oil-equivalent (boe).

Despite the high quality of the acreage, Eni’s huge signature-bonus bid caused surprise and might have been driven by Angola’s Chinese state-owned partner, Sonangol-Sinopec. (Angola’s licensing procedures require all participants to pay their shares of the winning bonus bid, if they accept the share the firm plans to divest.) Participants in Block 15/06 are Eni, 35%, Sonangol-Sinopec, 20%, Sonangol, 15%, Total, 15%, Falcon, 5%, Petrobas, 5%, and StatoilHydro, 5%.

Block 15/06 is Eni’s first substantial operation in Angola, although the firm has interests in several licences (including a 20% share in Block 15). Equity production in the country amounted to 136,000 bcd in 2007.

Eni plans to build up its operations in the country, in gas as well as oil – the firm has taken a share in the Angola LNG (liquified natural gas) venture and recently signed a gas co-operation agreement with Sonangol, which could lead to the construction of a second train.

Photo courtesy Eni

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features

North Sea oil production

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North Sea gas production

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Netherlands' TNO-NITG/Ministerie van Economische Zaken. Includes condensates and NGLs. UK and Netherlands include onshore. *Provisional
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